Fibre Optic Communications

Educator Kit ED-COM

COMPREHENSIVE LABORATORY BASED EDUCATIONAL PACKAGE IN OPTICAL FIBRE COMMUNICATIONS SYSTEMS

N.B. Oscilloscope not included

MAIN FEATURES AND BENEFITS:

- All fibre optic and optoelectronic hardware required to perform the experimental investigation
- Extensive literature support including: student and instructor's manuals with exercises, solutions & sample results
- Detailed lecture notes, tutorial examples and solutions to assist with the development of courses
- Saves 2-3 years of course, literature and hardware development effort

THE EXPERIMENTAL INVESTIGATION* ADDRESSES:

- Transmitter (LED & Laser) characteristics
- Fibre attenuation & connector losses
- Step, impulse & frequency response of components and system
- Fibre dispersion (material & modal)
- Receiver noise & sensitivity
- System performance:
  - Attenuation limits
  - Bit rate / Bandwidth limits
  - Bit rate.Length Products
- System design studies

***Full details of the experiments and equipment specifications are provided overleaf**

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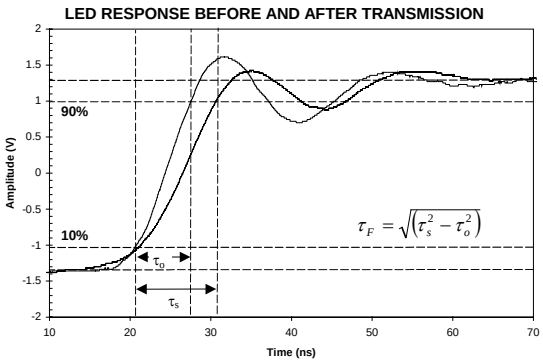
Laboratory Exercises

The ED-COM educator kit enables students to consolidate their knowledge and understanding and to acquire practical experience in the investigation, design, analysis and characteristics of fibre optic communications systems and their component parts. A full list of the available laboratory exercises is as follows: -

- Measurement of the characteristics of a LED and laser diode transmitter source including power versus drive current and fibre launched power.
- Measurement of the transmitter and receiver frequency responses, step function responses and system bandwidths using both the LED and laser sources (see sample results below).



- Construction and investigation of a 1, 2 & 3km long point to point fibre optic communications link.
- Determination of fibre connector loss.
- Measurement of the fibre link length and fibre attenuation coefficient.
- Measurement of the receiver noise and sensitivity, and the attenuation limited link length.
- Measurement of the frequency response, step function response and bandwidth of the 1, 2 & 3 km optical fibre links using both the LED and laser sources.
- Determination of the system bandwidth-distance product and bit rate-distance product for both the LED and laser transmitters.
- Differentiation between the effect of inter-modal and intra-modal dispersion using the large difference in linewidth between the laser and LED sources.
- Assessment of the differences in system performance resulting from the use of either a LED or laser transmitter addressing such issues as launched power and source linewidth and their implications in terms of the observed fibre dispersion, bandwidth, bit rate-distance product, and attenuation limited link length.
- Determination of the upper limits on link length, analogue bandwidth and digital bit rate.

Product Description

The OPTOSCI Fibre Optic Communications educator kit consists of the following hardware elements: -

- One 850nm ST connectorised LED transmitter with adjustable drive current (current reading displayed on an integral panel meter) and modulation signal input.
- One 790nm ST connectorised laser diode transmitter with adjustable drive current (current reading displayed on an integral panel meter) and modulation signal input.
- 1km reel of ST connectorised graded index multi-mode optical fibre.
- 2km reel of ST connectorised graded index multi-mode optical fibre.
- Two 1m lengths of ST connectorised optical fibre patchcord.
- One ST bulkhead connector
- One ST connectorised Si photodiode receiver with BNC signal output and detected power displayed on an integral panel meter
- A waveform generator which can be switched between a 4MHz square wave pulse generator and a variable frequency (1 to 25 MHz) sine wave generator.
- An integrated power supply and all required electrical interconnects and RF cables.

In addition, a comprehensive literature package is supplied as follows:-

- A set of student laboratory manuals, describing the background theory and experimental procedure, with associated exercises to encourage the student to discuss the implications of their results.
- A complete lecturer's operator manual dealing with all aspects of using the kit and providing sample results for the experiments and exercises.
- Extensive lecture notes on fibre optic communication systems covering the principles of all the issues dealt with in the laboratory exercises.
- A comprehensive set of tutorial examples and solutions.

Additional required equipment:-

- A two channel laboratory oscilloscope with a minimum bandwidth of 50MHz.

Extension Modules

- BER(COM) is an add-on module to ED-COM allowing investigation of Eye Diagrams and BER in optical communication systems (see separate datasheet for full details).

Ordering Information

ED-COM	Fibre Optic Communications
BER(COM)	BER in Optical Communications

Since OPTOSCI are committed to continuously improving the design and performance characteristics of our products, these specifications are subject to change without notice.

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